DEPARTMENT OF MATHEMATICS, STATISTICS AND COMPUTER SCCIENCE
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Rong GE

Research Interests

High performance computing, data intensive computing, performance modeling and analysis, energy efficient computing

Education

Doctor of Philosophy, Computer Science — Dec. 2007
Virginia Polytechnic Institute and State University, Blacksburg, VA

Master of Engineering, Computer Science and Engineering — Aug. 2005
University of South Carolina. Columbia, SC

Master of Science, Fluid Mechanics — Apr. 1998
Tsinghua University, Beijing, China

Bachelor of Science, Fluid Mechanics — Jul. 1995
Tsinghua University, Beijing, China

Professional Membership

IEEE, IEEE Women in Engineering, ACM, and Upsilon Pi Epsilon

Honors and Awards

• Outstanding Graduate Student Award	Virginia Tech	Dec. 2007
• ACM/IEEE SC07 Doctoral Research Showcase		Nov. 2007
• Outstanding Graduate Researcher	University of South Carolina	Apr. 2005
• Member of UPE Honor Society	University of South Carolina	Apr. 2005
• Best Graduate Thesis	Tsinghua University	Jul. 1998
• Graduate with Honor (1 out of 50 graduate students)	Tsinghua University	Jul. 1998
• Guanghuang Scholarship for Outstanding Graduate	Tsinghua University	1996
• Excellent Student Scholarship	Tsinghua University	1991 - 1994

Research Grants

- PI, "CSR: Small: Collaborative Research: Enabling Efficient MapReduce on Heterogeneous Networks". Submitted to NSF, $149,941.00. (Pending).
- PI, "CRS:Small: Collaborative Research: EEDAG: Exploring Energy Efficient Parallel Tasks Generation and Scheduling for Heterogeneous Multicore Systems". Sponsored by National Science Foundation, $53,655.00. (September 2011 - August 2012).
- Senior personnel, "NSF MRI-R2: Acquisition of a Heterogeneous Supercomputing Instrument for Transformative Interdisciplinary Research". Sponsored by National Science Foundation, $2,000,000.00. PI: Wu-chun Feng at Virginia Tech. (2011-2013).
- Senior personnel, "NSF MRI: Acquisition of Parallel Computing Cluster and Storage for the Marquette University Grid (MUGrid)". Sponsored by National Science Foundation, $560,000.00. (2009-2010).
- PI, "Marquette Regular Research Grant: Memory Contention and Its Impacts in Multicore Based High Performance Computing". Marquette University, $2,800.00. (May 2009 - August 2009).
- PI, "Marquette Summer Faculty Fellowship: Memory Contention and Its Impacts in Multicore Based High Performance Computing". Marquette University, $5,500.00. (May 2009 - August 2009).

Employment

Marquette University, Milwaukee, WI. August 2008 – present

Assistant professor; Department of Mathematics, Statistics and Computer Science

Virginia Tech, Blacksburg, VA. August 2005 – August 2008

1. *Postdoctoral Fellow and adjunct professor*; Department of Computer Science; January 2008- August 2008
2. *Research Assistant*; Department of Computer Science; August 2005 - December 2007
3. *System Administrator*; Scalable Performance Laboratory; August 2005 – August 2008

University of South Carolina, Columbia, SC. August 2001 – August 2005

1. *Research Assistant*; Department of Computer Science; May 2002 – August 2005
2. *Teaching Assistant*; Department of Computer Science, August 2001 – December 2004

Beijing Telecom, Beijing, China. April 1998 – September 2000

1. *Engineer;* Research & Development Center; April 1998 - September 2000
   - Designed and developed broad-band ATM and Ethernet telecommunication/data networks, and their novel applications and services. Projects included VOD on ATM and Ethernet networks and WebTV
2. *System Administrator;* Research & Development Center; April 1998 - September 2000
   - Administrated HP servers, SUN Ultra Enterprise 6000 systems, and database servers

Tsinghua University, Beijing, China. October 1994 – April 1998

Research Assistant; Department of Engineering Mechanics; October 1994 – April 1998

- Conducted research including two-phase flow modeling and numerical simulation.

Selected Systems and Software Developed

- SERA-IO: a system energy reduction agent for parallel I/O accesses.
- CPU MISER: a system software for energy reduction in workstations, servers, and clusters.
- PowerPack: the power measurement and analysis system to adapt cluster-wide energy and power at component-level granularity.
- DORI: a power-aware high-performance cluster built from dual-processor, dual-core AMD systems.
- NEMO: the first generation power-aware, high-performance cluster built from Dell laptop computers.
- ARGUS: a high-density, low-power supercomputer built from network load modules.
- SC Grid: an experimental computational grid built with two research clusters and more than 50 Solaris, Linux and Mac workstations in the Department of Computer Science and Engineering, Univ. of South Carolina.
- Beijing Telecom VOD System: a Video-On-Demand system that provided multimedia service over ATM and WAN to high speed internet subscribers in Beijing.
- Beijing Telecom WebTV System: a hardware/software platform that provided Internet-based video service to telecom subscribers.

Publications

Journal/Magazine Paper:

1. Xiaomin Zhu, Chuan He, Rong Ge and Peizhong Lu, *Boosting Adaptivity of Fault-Tolerant Scheduling for Real-Time Tasks with Service Requirements on Clusters*, Journal of Systems and Software, Vol 84, No. 10, 1708-1716 (2011).
2. Rong Ge, Xizhou Feng, Shuaiwen Song, Hung-Ching Chang, Dong Li, Kirk W. Cameron, *PowerPack: Energy profiling and analysis of High-Performance Systems and Applications*, IEEE Transactions on Parallel and Distributed Systems, Vol 21, No.5, 658-671 (2010).
3. Shuaiwen Song, Rong Ge, Xizhou Feng, Kirk W. Cameron, *Energy Profiling and Analysis of the HPC Challenge Benchmarks*, The International Journal of High Performance Computing Applications, Vol. 23, No. 3, 265-276 (2009)
4. Kirk W. Cameron, Rong Ge, Xian-He Sun, *lognP and log3P: Accurate analytical models of point-to-point communication in distributed systems*, IEEE Transactions on Computer, Volume 56, No. 3:314-327, 2007.
5. Xizhou Feng, Rong Ge, and Kirk W. Cameron, *The Argus Prototype: Aggregate Use of Load Modules as a High density Supercomputer*, Concurrency and Computation: Practice and Experience, Volume 18. No. 15, 2006, Pages 1975-1987.
6. Kirk W. Cameron, Rong Ge, Xizhou Feng, *High-Performance, Power-Aware Distributed Computing for*

Scientific Applications, IEEE Computer, Volume 38. No. 11, 2005, Pages 40-47.

7. Wu-chun Feng, Xizhou Feng, Rong Ge, *Green Supercomputing Comes of Age: From Passe to In Vogue*, IEEE IT Professional, 10(1): 17-23, January/February, 2008.
8. Ke-Qin Zhu, Rong Ge, Bao-Shu Xi, *The Squeezing flow of Electro-rheological Fluids between Circular Plates*, Journal of Tsinghua University (Science and Technology), No. 8, 1999.

Book Chapter:

9. Rong Ge and Kirk Cameron. *Models and Techniques for Energy Efficient High Performance Computing*, Book chapter in "Energy Aware Distributed Computing Systems". To appear in Wiley Series on Parallel and Distributed Computing.
10. Kirk W. Cameron, Rong Ge, Xizhou Feng, *Designing Computational Clusters for Performance and Power*, Advances in Computers, 2007.

Conference/Workshop Paper:

11. Rong Ge, Xizhou Feng and Xian-He Sun, *SERA-IO: Integrating Energy Consciousness into Parallel I/O Middleware*, accepted to the IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid), 2012.
12. Thomas Wirtz and Rong Ge. *Improving MapReduce Energy Efficiency for Computation Intensive Workloads*. The second International Green Computing Conference(IGCC2011), Jul 2011. (Orlando, USA)
13. Shuaiwen Song, Chun-Yi Su, Rong Ge, Abhinav Vishnu, and Kirk Cameron. *Iso-energy-efficiency: An Approach to Power-Constrained parallel Computation*, IEEE International Parallel and Distributed Processing Symposium, IPDPS2011.
14. Rong Ge, *Evaluating Parallel I/O Energy Efficiency*, IEEE/ACM International Conference on Green Computing and Communications (GreenCom2010), Hangzhou, China.
15. Dong Li, Rong Ge, and Kirk Cameron, *Unified Dynamic Thermal Control in High End Computing*, Accepted to International Conference on Parallel Processing, 2010.
16. Rong Ge, Xizhou Feng, Sindhu Subramanya, and Xian-He Sun, *Characterizing Energy Efficiency of Parallel I/O Intensive Applications on Power-Aware Clusters*. Proceedings of the 24th IEEE International Parallel and Distributed Processing Symposium (IPDPS'10), Apr 2010. (Atlanta, GA)
17. Craig Struble, Sheikh Iqbal Ahamed, Dennis Brylow, James Early, Praveen Madiraju, Rong Ge, Stephen Merrill, *Computational Thinking for the Sciences: A Three Day Workshop For High School Science Teachers*. Proceedings of the 41th SIG on Computer Science Education (SIGCSE2010), March 2010. (Milwaukee, WI)
18. Rong Ge, Xizhou Feng, Kirk Cameron, *Modeling and Evaluating Energy-Performance Efficiency of Parallel Processing on Multicore Based Power Aware Systems*, The 5th High Performance Power Aware Computing workshop in conjunction with the 23th IEEE International Parallel and Distributed Processing Symposium (IPDPS'09), May 2009. (Rome, Italy)
19. Zhenwei Cao, Layne T. Watson, Kirk W. Cameron, Rong Ge, *A Power Aware Study for VTDIRECT95 Using DVFS*, High Performance Computing Symposium, June 2009. (Ontario, CA)
20. Rong Ge, Xizhou Feng, Wuchun Feng, and Kirk Cameron, *CPU MISER: A Performance-Directed, Run-Time System for Power-Aware Clusters*, International Conference on Parallel Processing (ICPP07), Sept. 2007. (Xi'an, China)
21. Rong Ge, and Kirk W. Cameron, *Power-Aware Speedup*, Proceedings of the 21st IEEE International Parallel and Distributed Processing Symposium (IPDPS 07), March 2007. (Long Beach, CA)
22. Rong Ge, Xizhou Feng, and Kirk W. Cameron, *Performance-constrained, Distributed DVS Scheduling for Scientific Applications on Power-aware Clusters*, Proceedings of 2005 ACM/IEEE conference on High Performance Computing, Networking and Storage Conference (SC 2005), Seattle, WA, 2005.
23. Xizhou Feng, Rong Ge, and Kirk W. Cameron, *Power and Energy Profiling of Scientific Applications on Distributed Systems*, Proceedings of the 19th IEEE International Parallel and Distributed Processing Symposium (IPDPS 05), April 2005. (Denver, CO)
24. Rong Ge, Xizhou Feng, and Kirk W. Cameron, *Improvement of Power-Performance Efficiency for High-End Computing*, Proceedings of the 19th IEEE International Parallel and Distributed Processing Symposium (IPDPS'05) - HPPAC '05 Workshop, April 2005. (Denver, CO)
25. Xizhou Feng, Rong Ge, and Kirk W. Cameron, *ARGUS: Supercomputing in 1/10 Cubic Meter*. Parallel and Distributed Computing and Networks (PDCN 2005), February 2005.
26. Kirk W. Cameron and Rong Ge, *Predicting and Evaluating Distributed Communication Performance*, Proceedings of the 16th ACM/IEEE International Conference on High Performance Computing, Networking

and Storage Conference (SC 2004), November, 2004. (Pittsburgh, PA)

Poster:

1. Rong Ge, Xizhou Feng, Jiping Hu, and Xian-He Sun. *POSTER: Assessing Energy Efficiency of parallel I/O Systems*. The 22nd ACM/IEEE International Conference on High Performance Computing and Communications (SC 2010), November 2010.
2. Byron Galbraith, Craig Struble, Scott Beardsley, and Rong Ge, *POSTER: CUSUMMA: Scalable Matrix-Matrix Multiplication on GPUs with CUDA*. The 21st ACM/IEEE International Conference on High Performance Computing and Communications (SC 2009), November 2009.
3. Kirk W. Cameron, Rong Ge, Xizhou Feng, Drew Varner, and Chris Jones, *POSTER: High-performance, Power-aware Distributed Computing Framework*. The 16th ACM/IEEE International Conference on High Performance Computing and Communications (SC 2004), November 2004.

Technical Report:

1. Rong Ge, Xizhou Feng, and Xian-He Sun. *SERA-IO: Integrating Energy Consciousness into Parallel I/O Middleware*. Technical Report 480, Department of Mathematics, Statistics and Computer Science, Marquette University, 2011

Thesis:

1. R. Ge, *Theories and Techniques for Efficient High-End Computing*, Ph.D. thesis, Virginia Tech, Aug. 2007. (Doctoral Showcase in Supercomputing Conference 2007)
2. R. Ge, *The flow of Electro-rheological Fluids in Electro-rheological Devices*, Master thesis, Tsinghua University, 1998. (Best Graduate Thesis Award)
3. R. Ge, *The Parallel-Flow of Electro-rheological Fluids in Elctro-rheological Devices*, Bachelor thesis, Tsinghua University, 1995.

Patents/Disclosures

R. Ge, X. Feng, and K.W. Cameron, "Automatic, systemic, performance-constrained techniques for reducing power consumption in computer systems", VTIP Disclosure Number 07.029

Professional Activities

- Research conference committee member: SC12, IPDPS2012, CCGRID2012, NAS2012, HPDC2011, ScalCom2011, IGCC2011, PMP2011-12, GreenCom2010, HPPAC2005-12
- Workshop co-chair: HPPAC2009-10
- Journal research article reviewer: IEEE TPDS, IEEE TC, JPDC, Euro-Par, JNCA, Sustainable computing
- Grant proposal review panelist: NSF and DOE